

WHAT IS CLAIMED IS:

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1. An optical data recording method,
comprising the steps of:

interrupting an operation of recording data
10 in an optical data recording medium when a
predetermined amount of data is continuously recorded
in the optical data recording medium by using a laser
beam emitted from a laser;

measuring a recording state of the optical
15 data recording medium immediately before the
interruption;

correcting a recording power of the laser
beam for a next recording operation in the optical data
recording medium based on the measured recording state;
20 and

starting the next recording operation by
using the laser beam with the determined recording
power in the optical data recording medium at a
position immediately after the interruption.

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2. The optical data recording method as
claimed in claim 1, wherein

in the step of interrupting, the
predetermined amount of data is determined so that a
5 time period required for completing recording of the
predetermined amount of data is shorter than a time
period over which a recording quality degrades due to a
rise of a temperature of the laser.

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3. The optical data recording method as
claimed in claim 1, wherein

15 in the step of interrupting, the
predetermined amount of data is determined so that a
length along a radial direction of the optical data
recoding medium covered by the predetermined amount of
data is shorter than a length over which a recording
20 quality degrades due to a fluctuation of a sensitivity
of a recording layer of the optical data recoding
medium.

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4. The optical data recording method as
claimed in claim 1, wherein

in the step of measuring, the recording
state is measured during a seek operation performed for
5 the next recording operation after the interrupted
recording operation.

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5. The optical data recording method as
claimed in claim 1, wherein

in the step of correcting, a change of the
recording power in each correction is restricted to be
15 less than a predetermined value.

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6. The optical data recording method as
claimed in claim 1, wherein

in the step of measuring, the recording
state of the optical data recording medium is obtained
by measuring an asymmetry of a reproduced signal.

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7. The optical data recording method as claimed in claim 1, wherein

in the step of measuring, the recording state of the optical data recording medium is obtained
5 by measuring a modulation of a reproduced signal.

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10 8. An optical data recording device, comprising:

a recording state measurement unit configured to measure a recording state of an optical data recording medium;

15 a recording power calculation unit configured to calculate a recording power of a laser beam emitted from a laser for a next recording operation in the optical data recording medium based on the measured recording state;

20 a laser control unit configured to control the laser based on the calculated recording power; and

a recording control unit configured to interrupt an operation of recording data in the optical data recording medium when a predetermined amount of
25 data is continuously recorded in the optical data

recording medium, direct the recording state measurement unit to measure a recording state of the optical data recording medium immediately before the interruption, direct the recording power calculation 5 unit and the laser control unit to determine a recording power of the laser beam for a next recording operation in the optical data recording medium based on the measured recording state, and start the next recording operation by using the laser beam with the 10 determined recording power in the optical data recording medium at a position immediately after the interruption.

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9. An optical data processing device,
comprising an optical data recording device including:
a recording state measurement unit
20 configured to measure a recording state of an optical data recording medium;
a recording power calculation unit
configured to calculate a recording power of a laser beam emitted from a laser for a next recording 25 operation in the optical data recording medium based on

the measured recording state;

a laser control unit configured to control
the laser based on the calculated recording power;

a recording control unit configured to

- 5 interrupt an operation of recording data in the optical data recording medium when a predetermined amount of data is continuously recorded in the optical data recording medium, direct the recording state measurement unit to measure a recording state of the
- 10 optical data recording medium immediately before the interruption, direct the recording power calculation unit and the laser control unit to determine a recording power of the laser beam for a next recording operation in the optical data recording medium based on
- 15 the measured recording state, and start the next recording operation by using the laser beam with the determined recording power in the optical data recording medium at a position immediately after the interruption.

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10. An optical data recording method,
25 comprising the steps of:

interrupting an operation of recording data
in an optical data recording medium when a
predetermined amount of data is continuously recorded
in the optical data recording medium by using a laser
5 beam emitted from a laser;

measuring a recording state of the optical
data recording medium immediately before the
interruption to measure a recording quality;

correcting a recording power of the laser
10 beam for a next recording operation in the optical data
recording medium based on the determined recording
quality; and

starting the next recording operation by
using the laser beam with the determined recording
15 power in the optical data recording medium at a
position immediately after the interruption,

wherein

in the step of measuring, the recording
quality is measured in a seek operation performed when
20 starting the next recording operation after the
interrupted recording operation, a setting being made
so that a reading quality is an optimum during the
measurement of the recording quality, and the setting
being made so that the recording quality is an optimum
25 after the measurement of the recording quality.

11. The optical data recording method as
claimed in claim 10, wherein

in the step of measuring, an offset of a
focus position of a focus servo is set so that the
5 reading quality is an optimum during the measurement of
the recording quality in the seek operation, and the
offset of the focus position is set so that the
recording quality is an optimum after the measurement
of the recording quality.

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12. The optical data recording method as
15 claimed in claim 10, wherein

in the step of measuring, an offset of a
tilt of the optical data recording medium is set so
that the reading quality is an optimum during the
measurement of the recording quality in the seek
20 operation, and the offset of the tilt is set so that
the recording quality is an optimum after the
measurement of the recording quality.

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13. An optical data recording device,
comprising:

a recording state measurement unit
configured to measure a recording state of an optical
5 data recording medium to measure a recording quality;

a recording power calculation unit
configured to calculate a recording power of a laser
beam emitted from a laser for a next recording
operation in the optical data recording medium based on
10 the measured recording quality;

a laser control unit configured to control
the laser based on the calculated recording power;

a recording control unit configured to
interrupt an operation of recording data in the optical
15 data recording medium when a predetermined amount of
data is continuously recorded in the optical data
recording medium, direct the recording state
measurement unit to measure a recording state of the
optical data recording medium immediately before the
20 interruption, direct the recording power calculation
unit and the laser control unit to determine a
recording power of the laser beam for a next recording
operation in the optical data recording medium based on
the measured recording quality, and start the next
25 recording operation by using the laser beam with the

determined recording power in the optical data recording medium at a position immediately after the interruption; and

- a focus position offset setting unit
5 configured to set an offset of a focus position of a focus servo,

wherein the focus position offset setting unit sets the offset of the focus position of the focus servo so that the reading quality is an optimum during
10 the measurement of the recording quality in the seek operation, and sets the offset of the focus position so that the recording quality is an optimum after the measurement of the recording quality in the seek operation.

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14. An optical data recording device,
20 comprising:

a recording state measurement unit
configured to measure a recording state of an optical data recording medium to measure a recording quality;
a recording power calculation unit
25 configured to calculate a recording power of a laser

beam emitted from a laser for a next recording operation in the optical data recording medium based on the measured recording quality;

a laser control unit configured to control

5 the laser based on the calculated recording power;

a recording control unit configured to interrupt an operation of recording data in the optical data recording medium when a predetermined amount of data is continuously recorded in the optical data

10 recording medium, direct the recording state measurement unit to measure a recording state of the optical data recording medium immediately before the interruption, direct the recording power calculation unit and the laser control unit to determine a

15 recording power of the laser beam for a next recording operation in the optical data recording medium based on the measured recording quality, and start the next recording operation by using the laser beam with the determined recording power in the optical data

20 recording medium at a position immediately after the interruption; and

a tilt offset setting unit configured to set an offset of a tilt of the optical data recording medium,

25 wherein the tilt offset setting unit sets

the offset of the tilt so that the reading quality is an optimum during the measurement of the recording quality in the seek operation, and sets the offset of the tilt so that the recording quality is an optimum
5 after the measurement of the recording quality in the seek operation.

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15. An optical disk device for recording data to or reproducing data from an optical disk, comprising:

an optical pickup that writes data to or
15 reads data from the optical disk;
a focusing error signal generating unit that generates a focusing error signal from a signal output from the optical pickup;

an offset generating unit that generates an
20 offset of a focusing position according to a preset value;

an accumulator that adds the offset to the focusing error signal and outputs the summed signal;

a filter circuit that adjusts a gain and a
25 phase of a focusing servo system based on the summed

signal from the accumulator; and

a driver circuit that drives the optical pickup according to a signal output from the filter circuit,

5 wherein

in a seek operation, an optimum offset of the focusing position is set to the offset generating unit as the preset value, and the seek operation is finished after setting a time period in a timer;

10 in a recording operation or a reproducing operation after the seek operation, a count in the timer is monitored to determine whether the time period set in the timer has elapsed; and

15 the recording operation or reproducing operation is interrupted when the time period set in the timer has elapsed, and a next seek operation is performed and a next recording operation or a next reproducing operation is started at a position of the interruption.

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16. The optical disk device as claimed in
25 claim 15, wherein

the time period set to the timer is
determined so that a variation of the optimum of the
offset of the focus position due to movement of the
optical pickup along a radial position on the optical
5 disk in the recording operation or the reproducing
operation does not influence a recording quality or a
reproducing quality.

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17. The optical disk device as claimed in
claim 15, wherein

the time period set to the timer is
15 determined based on a variation of the optimum of the
offset of the focus position.

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18. The optical disk device as claimed in
claim 15, further comprising a storage unit configured
to store focus offset data measured in advance and
corresponding to optimum recording or reproducing
25 quality at a plurality of positions on the optical disk

at different radii and at equal intervals;

wherein

the focus offset data corresponding to one
of the positions is read out from the storage unit and
5 set to the offset generating unit in the recording
operation or the reproducing operation as the offset
added to the focusing error signal.

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19. The optical disk device as claimed in
claim 15, wherein

when mounting the optical disk, an offset of
15 the focus position resulting in the optimum recording
quality or the optimum reproducing quality is measured
beforehand in an inner area of the optical disk;

in a region from a most inner area of the
optical disk to a radial position of the optical disk
20 where a change of the offset of the focus position
begins to increase, the measured offset of the focus
position is set to the offset generating unit;

in a most peripheral region of the optical
disk, an offset of the focus position obtained by
25 shifting the offset measured in the inner area by a

6)
preset value is set to the offset generating unit; and
in a region from the position where the
change of the offset of the focus position begins to
increase to the most peripheral region of the optical
5 disk, an offset calculated by a first order
approximation is set to the offset generating unit.

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20. The optical disk device as claimed in
claim 15, wherein

when mounting the optical disk, offsets of
the focus position resulting in the optimum recording
15 quality or the optimum reproducing quality are measured
beforehand in an inner area and a peripheral area of
the optical disk, respectively;

in a region from a most inner area of the
optical disk to a radial position of the optical disk
20 where a change of the offset of the focus position
begins to increase, the offset measured in the inner
area is set to the offset generating unit;

in the most peripheral region of the optical
disk, the offset measured in the peripheral area is set
25 to the offset generating unit; and

in a region from the position where the
change of the offset of the focus position begins to
increase to the most peripheral region of the optical
disk, an offset of the focus position calculated by a
5 first order approximation is set to the offset
generating unit.

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21. The optical disk device as claimed in
claim 19, further comprising a jitter measurement unit
configured to measure a jitter of the reproduced signal
from the pickup,

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wherein
the optimum of the offset of the focus
position is determined under a condition that the
jitter is the smallest.

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22. The optical disk device as claimed in
claim 19, further comprising an amplitude measurement
25 unit configured to measure an amplitude of the

reproduced signal from the pickup,

wherein

the optimum of the offset of the focus
position is determined under a condition that the
5 amplitude is the highest.

10 23. The optical disk device as claimed in
claim 21, wherein

if the optical disk is not recorded, data
are recorded in a trial recording region of the optical
disk; and

15 the data recorded in the trial recording
region are reproduced to determine the offset of the
focus position that results in the optimum of the
reproducing quality.

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24. The optical disk device as claimed in
claim 22, wherein if the optical disk is recorded, data
25 in a recorded region of the optical disk are reproduced

to determine the offset of the focus position that results in the optimum of the reproducing quality under a condition that an amplitude of the reproduced signal is the highest.

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25. The optical disk device as claimed in
10 claim 19, further comprising a wobbling signal amplitude measurement unit configured to measure an amplitude of a wobbling signal;
wherein the optimum of the offset of the focus position is determined under a condition that the
15 amplitude of the wobbling signal is the highest.